

Having thus described the invention, what is claimed as new and secured by Letters Patent is:

1. A system for improving power efficiency of a memory switch, said memory switch enabling propagation of data, through said memory switch, from a source to a plurality of destinations, said system comprising:

at least one grain select block for selecting and storing specific data, said specific data being propagated to a subset of destinations within said plurality of destinations, each grain select block containing fanout information for propagating said specific data to said group of destinations;

at least one data disable block for providing a data connection from said source to said at least one grain select block based on said fanout information, said at least one data disable block receiving said data from said source;

wherein said specific data is propagated over a pre-defined interval of time from said at least one data disable block to said at least one grain select block.

2. An egress selection switch block, comprising:

a plurality of grain select blocks for selecting and storing a plurality of ingress data grains, each grain select block having:

- a connection memory having memory contents defining an egress data grain at a corresponding grain select block, said egress data grain being defined by a pre-selected ingress port and a pre-selected timeslot of said plurality of ingress data grains;
- a multiplexer for selecting a particular ingress data grain based on said pre-selected ingress port and said pre-selected timeslot in said connection memory;
- a data storage device for storing output received from said multiplexer; and
- means for outputting said egress data grain from said data storage device to said plurality of egress ports.

3. An egress selection switch, comprising:
 - a plurality of ingress ports for transmitting a plurality of ingress data grains;
 - a plurality of egress ports for receiving a plurality of egress data grains,said plurality of egress ports forming at least two egress port groups;
 - a timeslot counter for identifying a particular timeslot number for each ingress data grain of said plurality of ingress data grains; and
 - a plurality of egress selection switch blocks for selecting and storing said plurality of ingress data grains, each egress selection switch block containing a plurality of grain select blocks having:
 - a connection memory having memory contents defining an egress data grain at a corresponding grain select block, said egress data grain being defined by a pre-selected ingress port and a pre-selected timeslot of said plurality of ingress data grains;
 - a multiplexer for selecting a particular ingress data grain based on said pre-selected ingress port and said pre-selected timeslot in said connection memory;
 - a data storage device for storing output received from said multiplexer; and
 - means for outputting said egress data grain from said data storage device to said plurality of egress ports;wherein said time slot counter is coupled to said plurality of grain select blocks.
4. The egress selection switch as in claim 3, wherein said timeslot counter is synchronized to a clock pulse.
5. The egress selection switch as in claim 3, wherein said grain select block further includes a microprocessor interface for updating contents of said connection memory.

6. The egress selection switch as in claim 3, wherein each of said plurality of ingress ports is aligned with a time division multiplex channel of ingress data grains.

7. The egress selection switch as in claim 3, wherein said data storage device is a data flip flop.

8. The egress selection switch as in claim 3, wherein said switch is embodied in an integrated circuit chip.

9. An egress selection switch, comprising:

a plurality of data disable blocks for fanout of ingress data grains to at least one of said plurality of egress ports, each data disable block having:

- a data disable control memory; and
- a plurality of data storage devices being coupled to said data disable control memory, each data storage device of said plurality of data storage devices propagating a particular ingress data grain to a particular egress port group and enabling propagation of said particular ingress data grain based on information stored in said data disable control memory;

wherein said data disable control memory is connected to said plurality of data storage devices.

10. An egress selection switch, comprising:

- a plurality of ingress ports for transmitting a plurality of ingress data grains;
- a plurality of egress ports for receiving a plurality of egress data grains, said plurality of egress ports forming at least two egress port groups;
- a timeslot counter for identifying a particular timeslot number for each ingress data grain of said plurality of ingress data grains; and

a plurality of data disable blocks for fanout of ingress data grains to at least one of said plurality of egress ports, each data disable block of said plurality of data disable blocks having:

- a data disable control memory; and
- a plurality of data storage devices being coupled to said data disable control memory, each data storage device of said plurality of data storage devices propagating a particular ingress data grain to a particular egress port group and enabling propagation of said particular ingress data grain based on information stored in said data disable control memory;

wherein said data disable control memory is connected to said plurality of data storage devices; and

wherein said time slot counter is coupled to said data disable control memory.

11. The egress selection switch as in claim 10, wherein said information stored in said data disable control memory is data bit information.

12. The egress selection switch as in claim 10, wherein said data disable control memory is coupled to a microprocessor interface for updating said information stored in said data disable control memory.

13. The egress selection switch as in claim 12, wherein said plurality of data storage devices is a plurality of data flip flops.

14. The egress selection switch as in claim 13, wherein a particular flip flop of said plurality of flip flops toggles said particular ingress data grain as said particular flip flop is logically enabled based on information stored in said data disable control memory means.

15. The egress selection switch as in claim 13, wherein each of said plurality of flip flops is a D type flip flop.

16. The egress selection switch as in claim 13, wherein each of said plurality of flip flops is connected to a clock gating circuit.

17. The egress selection switch as in claim 10, further including a plurality of grain select blocks for selecting and storing said plurality of ingress data grains received from said plurality of data disable blocks, and a system for outputting a pre-defined egress data grain to one of said plurality of egress ports, wherein said plurality of grain select blocks are coupled to said plurality of data disable blocks.

18. A telecommunication system including a data switch, said data switch enabling propagation of data, through said data switch, from a source to a plurality of destinations, said system comprising:

at least one grain select block for selecting and storing specific data, said specific data being propagated to a subset of destinations within said plurality of destinations, each grain select block containing fanout information for propagating said specific data to said group of destinations;

at least one data disable block for providing a data connection from said source to said at least one grain select block based on said fanout information, said at least one data disable block receiving said data from said source;

wherein said specific data is propagated over a pre-defined interval of time from said at least one data disable block to said at least one data select block.

19. A method for improving efficiency of a data switch, said data switch propagating transmission of ingress data to at least one egress port in a pre-defined interval of time from an ingress side of said switch to an egress side of said switch, said method comprising steps:

a) grouping a plurality of egress ports into at least two egress port groups;

- b) disabling said propagation of said ingress data to at least one egress port group of said at least two egress port groups;
- c) defining egress data based on a predefined selection of said ingress data by at least one egress port group being enabled for propagation of said ingress data; and
- d) storing said egress data and said ingress data for output to said corresponding egress port.

20. A method for improving efficiency of a data switch, said data switch propagating transmission of ingress data to at least one egress port in a predefined interval of time from an ingress side of said switch to an egress side of said switch, said method comprising steps:

- a) grouping a plurality of egress ports into at least two egress port groups;
- b) generating signals containing a predefined data selection for propagation, from said egress side to said ingress side, through a data fanout tree;
- c) disabling propagation of said ingress data to at least one egress port group of said at least two egress port groups based on said predefined data selection;
- d) defining egress data based on said predefined data selection of said ingress data by at least one egress port group being enabled for propagation of said ingress data; and
- e) storing said egress data and said ingress data for output to said corresponding egress port.

21. The method as in claim 20, further including after step c) a step of overwriting by a constant value half the bits asserted by said ingress data disabled in step c).

23. The method as in claim 20, for said fanout tree having at least one pair of sub-trees, further including after step c) a step of overwriting by a first constant

value said ingress data derived from an enable signal through a first of said at least one pair of sub-trees and by a second constant value said ingress data derived from an enable signal through a second of said at least one pair of sub-trees, such that said first constant value and said second constant value are complementary and said first constant value and said second constant value form a different complementary pair of constants for each pair of sub-trees.

24. An egress selection switch, comprising:

a plurality of grain select blocks for selecting and storing a plurality of ingress data grains, each grain select block having:

- a connection memory having memory contents defining an egress data grain at a corresponding grain select block, said egress data grain being defined by a pre-selected ingress port and a pre-selected timeslot of said plurality of ingress data grains;
- a multiplexer for selecting a particular ingress data grain through fanout based on said pre-selected ingress port and said pre-selected timeslot in said connection memory;
- a data storage device for storing output received from said multiplexer; and
- means for outputting said egress data grain from said data storage device to said plurality of egress ports;

wherein said connection memory having decode logic to generate a signal from said each grain select block for selectively enabling and disabling fanout of said plurality of ingress data grains.

25. The egress selection switch as in claim 24, further including a main timeslot counter for identifying a particular timeslot number for each ingress data grain of said plurality of ingress data grains, and a lookahead timeslot counter provided to compensate for delay occurring in said decode logic, wherein said lookahead timeslot counter runs ahead of said main timeslot counter.

26. A system for improving power efficiency of a memory switch, said memory switch enabling propagation of data, through said memory switch, from a source to a plurality of destinations, said system comprising:

at least one grain select block for selecting and storing specific data, said specific data being propagated to a subset of destinations within said plurality of destinations, each grain select block containing fanout information for propagating said specific data to said group of destinations through a fanout tree;

at least one data disable block for providing a data connection from said source to said at least one grain select block based on said fanout information, said at least one data disable block receiving said data from said source;

wherein said specific data is propagated over a pre-defined interval of time from said at least one data disable block to said at least one grain select block, and

wherein said fanout information is generated as a signal propagating from a tail end of said fanout tree to a root end of said fanout tree to enable propagation of said specific data from said source.

27. The system as in claim 26, wherein said fanout tree includes logical OR trees and logical AND trees, wherein said logical OR trees propagate said fanout information to said at least one grain select block and said logical AND trees disables a portion of said fanout tree by only propagating said specific data to said subset of destinations.